Dual lattice photonic-crystal beam splitter

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Light propagation in photonic crystals (PhCs) is both sensitive to incident angle and wavelength. By combining two different PhC lattices, we utilise this effect to demonstrate a wavelength-dependent beam splitter with enhanced angular separation. The first lattice (250nm) belongs to branch 1 acts as a superprism that separates the incoming light according to wavelength (Fig. 1a), whereas the second lattice (420nm) in branch 3 acts as an angular amplifier (Fig. 1b). We obtain 90^{o} angular separation (Fig. 3) for two wavelengths separated by 70 nm (1300 nm regime) in a structure that is less than 10 μm long.

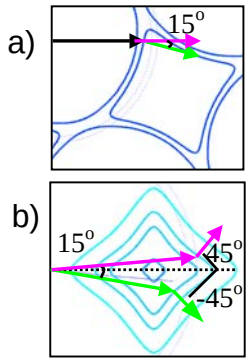

Fig. 1 a) Equi-frequency Contours (EFCs) for branch 1; b) EFCs for branch 3

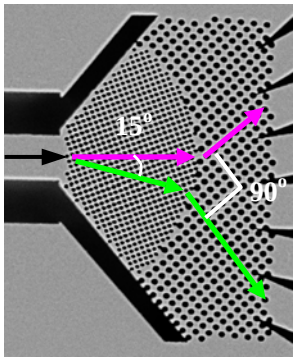

Fig. 2 SEM (top view) of PhCs with input and output waveguides

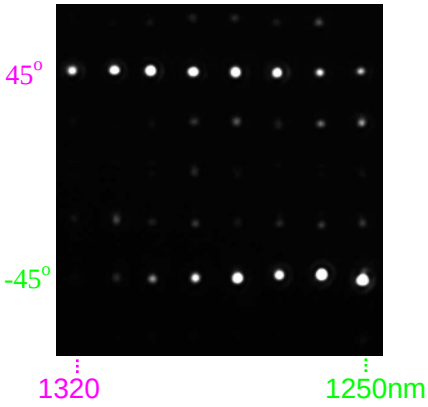

Fig. 3 Vidicon micrographs of the output facets as a function of wavelength.